Department of Energy
Washington, DC 20585

January 5, 2009

The Honorable Daniel K. Inouye
Chairman
Committee on Commerce, Science and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

On September 24, 2008, Edward Sproat, Director, Office of Civilian Radioactive Waste Management, testified regarding the Safety and Security of Spent Nuclear Fuel Transportation.

Enclosed are the answers to 19 questions that were submitted by you and Senators Reid and Boxer to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Lillian Owen, at (202) 586-2031.

Sincerely,

Lisa E. Epifani
Assistant Secretary
Congressional and Intergovernmental Affairs

Enclosures

QUESTIONS FROM SENATOR REID

Q1. If the Department of Energy (DOE) is able to maintain its current schedule for licensing and building the Yucca Mountain nuclear waste repository, when is the soonest you could begin transporting nuclear waste? Would the DOE consider shipping nuclear waste prior to completing construction at Yucca?

A1. Under the Nuclear Waste Policy Act, the Department of Energy (DOE) could not begin transporting spent nuclear fuel and high-level radioactive waste to the Yucca Mountain repository until the Nuclear Regulatory Commission (NRC) issues a construction authorization license and a repository license to receive and possess spent nuclear fuel and high-level radioactive waste for disposal. Under current planning, the earliest date that DOE anticipates that it would begin transporting waste to the Yucca Mountain repository is 2020.

Q2. In 2007, the DOE officially gave Congress draft legislation that would abolish Department of Transportation (DOT), Nuclear Regulatory Commission (NRC), Surface Transportation Board, and state authority over transportation of nuclear waste. Does the DOE still support this legislation? Will the DOE be able to ship waste if Congress does not eliminate these other agencies' authorities over nuclear waste shipments?

A2. The Department supports the proposed legislation which would not abolish or otherwise change the existing authority of DOT, NRC, the Surface Transportation Board, States and other entities over transportation of nuclear waste by or on behalf of DOE. Rather, Section 7 of the proposed legislation would clarify the manner in which the Department may exercise its existing authority to regulate the safety and security of transportation of radioactive materials to Yucca Mountain. DOE has broad authority under the Atomic Energy Act of 1954, as amended (AEA), to regulate all aspects of activities involving radioactive materials that are undertaken by DOE or on its behalf, including the transportation of radioactive materials. DOE exercises this authority to regulate certain

DOE shipments, such as shipments undertaken by governmental employees or shipments involving national security. In most cases where DOE utilizes commercial carriers, however, DOE does not exercise its AEA authority but rather relies on regulation of these shipments by DOT, NRC and other entities as appropriate. With respect to shipments to Yucca Mountain, DOE currently plans to use commercial carriers regulated by DOT.

As a policy matter and without regard to which agency exercises regulatory authority, DOE requires shipments by it or on its behalf to be undertaken in accordance with the requirements and standards that apply to comparable commercial shipments, except where there is a determination that national security or another critical interest requires different action. This policy is set forth in DOE Orders 460.1B, Packaging and Transportation Safety, 460.2A, Departmental Materials Transportation and Packaging Management, and 470.4A, Safeguards and Security Program, as well as DOE Manual 460.2-1A, Radioactive Material Transportation Practices Manual. In implementing this policy, DOE will cooperate with Federal, State, local and Tribal entities and utilize existing expertise and resources to the extent practicable. In all cases, DOE is committed to achieving a level of protection that meets or exceeds the level of protection associated with comparable commercial shipments regulated by DOT and NRC.

Q3. CSX Transportation recently expressed concern that the DOE could be reversing its plan to use dedicated railcars for shipping spent nuclear fuel. CSX stated that the DOE is now stressing the need for "flexibility" so they can reserve the option of shipping spent fuel together with other commercial items. Is the DOE reversing its position and if so, why does the DOE now think it is safe to transport commercial and nuclear shipments together?

A3. In July 2005, DOE adopted a policy to use dedicated trains as its usual service mode of rail transportation for shipments of commercial spent nuclear fuel and high-level radioactive waste to the Yucca Mountain repository, and that policy has not changed. In adopting the policy, DOE has recognized that such materials can be shipped safely regardless of mode and regardless of type of service due primarily to the stringent regulations in place and the robust nature of the transport packages involved. In adopting the policy, DOE has additionally identified the primary benefit of using dedicated trains to be the significant costs savings over the lifetime of the Yucca Mountain Program. However, there may also be circumstances where general freight service would be more appropriate to promote costs savings, operational flexibility and/or efficiency for shipments to the Yucca Mountain repository.

Q4. The National Academy of Sciences, the Government Accountability Office and even the State of Nevada have recommended that the oldest spent nuclear fuel should be shipped first. They claim that storing nuclear waste at the reactor for 50 years or more before shipping it can reduce public health risks from radiation by up to 85 percent. The Academy also notes that this will reduce the consequences of a terrorist attack. So why hasn't the DOE considered shipping older fuel first in its environmental impact statements (EIS)?

A4. In developing the impact analyses in its environmental impact statements, DOE used conservative, "bounding" assumptions. This is a standard risk assessment practice to ensure the actual impacts likely to occur will be less than—in some cases, much less than—the calculated estimate of impacts. The age and radioactivity level of the fuel is one example. In DOE's analyses, the Department has assumed that every shipment of spent nuclear fuel would have the very highest level of radioactivity permissible by Federal regulation, every single time, which in reality is not possible (older fuel already exists). DOE's analysis showed that, even if every shipment had the very highest levels

permissible, the shipments would still pose a very low risk. The fuel in any particular shipment, regardless of age, does not present a safety or security issue so long as the material is packaged and transported in accordance with the strict regulations that apply to such shipments.

Q5. In May, Holtec International – a firm that submitted a bid to design the transportation canisters for the DOE – said that an earthquake at Yucca Mountain would send the casks into a "chaotic melee of bouncing and rolling juggernauts" if it were to rely on the DOE's specifications. The firm said that "pigs will fly before the cask will stay put." Has the DOE taken any steps to respond to Holtec's concerns?

A5. In June 2008, DOE submitted its license application for authorization to construct the repository, and in September 2008, NRC docketed and commenced its detailed review of the application. The NRC will conduct a thorough and rigorous review, pursuant to NRC's applicable regulations, of DOE's license application and will determine the adequacy and safety of the repository. The NRC will similarly conduct a rigorous and thorough review of the applications that will be submitted for certificates of compliance for the casks used to transport and age spent nuclear fuel on site.

Q6. Why hasn't the DOE requested an independent assessment of nuclear waste transportation security, as was recommended by the National Academy of Sciences in their 2006 report?

A6. DOE agrees with NRC's position that security measures for future shipments must defend against the threat that exists at the time of that shipment, and take advantage of enhancements in technology then available. Since these factors may change over time and shipments to the Yucca Mountain repository are not expected to begin until 2020 at the earliest, it would be more appropriate to conduct an independent security assessment closer to the time of actual shipments. DOE, nevertheless, is currently a participant in a

Multilateral Agreement with Great Britain, France and Germany to conduct classified laboratory tests that would accurately measure the impacts of sabotage events on spent fuel. These tests will inform future security assessments.

Q7. Has the DOE made public its plan for selecting national rail and truck routes, as recommended by the National Academy of Sciences?

A7. DOE has addressed routing in its National Environmental Policy Act (NEPA) documentation relating to transportation, both nationally and in Nevada, of spent nuclear fuel and high-level radioactive waste to Yucca Mountain. Truck shipments will be shipped in accordance with DOT regulations, using preferred routes that reduce time in transit. A preferred route is an Interstate system highway selected by a State or Tribal routing agency in accordance with applicable DOT regulations. Under those regulations, substantive consultation with affected jurisdictions would be required prior to designating an alternative route to ensure consideration of all impacts and continuity of designated route.

Rail shipments would be shipped using routes selected by the rail carriers, which have responsibility for selection of rail routes. Railroads are privately owned and operated, and shippers and rail carriers determine routes based on a variety of factors. Route selection for shipments to Yucca Mountain would involve discussions between DOE and the chosen rail carriers, with consideration of input from other stakeholders. While Federal rules do not prescribe specific routes for spent nuclear fuel and high-level radioactive waste shipments by rail, certain factors must be considered in route selection.

DOE anticipates that it will identify a preliminary suite of national routes five years prior to shipments in order to identify States and Tribes that will be eligible for technical assistance and funds for training under Section 180(c) of the Nuclear Waste Policy Act. Over the past several years, the DOE has engaged in discussions with rail carriers and other stakeholders on issues related to routing.

Q8. Has the DOE established a social risk advisory group, as recommended by the National Academy of Sciences?

A8. As the National Academy of Sciences recommended, DOE has engaged stakeholders on methods to communicate about transportation safety, and is currently exploring the formation of an advisory group chartered under the Federal Advisory Committee Act to provide input on a range of transportation issues, including the public perception of risk.

Q9. What is the DOE's contingency plan for transporting waste to Yucca Mountain in the event that rail access to Yucca is not available by the time Yucca is opened? Was this considered in the DOE's Rail Alignment EIS?

A9. In order to operate efficiently and meet its obligations under the Nuclear Waste Policy Act, DOE needs to have direct rail access to the Yucca Mountain repository. The facility will be able to accept truck shipments of spent nuclear fuel, but rail access will be required to efficiently ship larger transportation, aging and disposal (TAD) canisters that are the basis of the repository design. DOE plans for the railroad to be available before commencement of shipments of spent nuclear fuel and high-level radioactive waste. If the railroad were not initially available, however, DOE anticipates that it would consider shipments of spent fuel in small truck casks that are included in the scenarios analyzed in the Department's NEPA documentation relating to the Yucca Mountain repository.

Q10. Out of 72 commercial sites with nuclear waste, 24 of them do not have railroad access. That means the DOE will have to haul waste by truck from at least one third of nuclear reactors. Does the DOE plan to truck the waste to the railroad? Has the DOT approved this approach, given that they are highly concerned about unnecessary stops during transport?

A10. Sites without direct rail access will be serviced by heavy-haul trucks to transport rail casks to a nearby railhead. If a site were unable to accommodate a rail cask, a smaller, truck cask would be used on standard size semi-truck trailers. Intermodal transfers are common in the transportation industry, and the logistical challenges are well-understood. At this time, more than 10 years before shipments, potential site-specific transportation infrastructure issues cannot be known with any degree of certainty. DOE also evaluated the use of barge transportation for transporting rail casks to nearby railheads from generator sites near navigable waterways but not served by railheads.

QUESTION FROM SENATOR INOUYE

Q1. The DOE will have the authority to begin shipments to Yucca Mountain if the NRC approves the license application for construction authorization, which could very quickly lead to the large quantities of nuclear waste being shipped to Yucca Mountain. What steps has the DOE taken to prepare the public for the increase in these shipments? Has the DOE been actively addressing public concerns over these shipments?

A1. Since passage of the Nuclear Waste Policy Act (NWPA) in 1982, DOE has been working with its stakeholders to identify, address, and resolve issues of concern related to the transport of spent nuclear fuel and high-level radioactive waste. DOE has worked with law enforcement, emergency response, and public safety officials from potentially impacted States, Tribes, and local governments to communicate information about spent nuclear fuel transportation. As specific concerns are identified, DOE has addressed them through outreach programs and in discussions at Transportation External Coordination Working Group conferences. DOE has also maintained cooperative agreements with State Regional Groups (e.g., the Western Interstate Energy Board), public safety organizations (e.g., the Commercial Vehicle Safety Alliance), and legislative organizations (e.g., the National Conference of State Legislatures), all specifically for the purpose of addressing concerns and helping corridor communities prepare for the planned shipments. DOE additionally has responsibilities under Section 180(c) of the NWPA to provide funding and technical assistance for training to States and Tribes and will make such funding available.

QUESTIONS FROM SENATOR BOXER

Q1. When will routes and shipment schedules be established? Will the public have access to the route information? If not, why not?

A1. The selection of truck routes will be made in accordance with DOT routing regulations set forth in Title 49 of the Code of Federal Regulations. The selection of railroad routes will be the responsibility of the carriers, as specified in Title 49 of the Code of Federal Regulations. DOE is working with stakeholders to establish routing criteria and will work in close cooperation with the carriers to ensure that routes selected will be safe, secure, and efficient. Authorized officials will be provided specific routes and shipping schedules as part of the NRC required pre-notifications that will be made before each shipment. Specific routes and shipping schedules will not be available to the general public for security reasons.

Q2. How much of the spent nuclear fuel are you expecting to be transported over highways rather than rail? Are TAD canisters being developed that can be transported by tractor trailers?

A2. DOE estimates about ten percent of the spent nuclear fuel to Yucca Mountain will be shipped by truck. The TAD canisters currently being designed will be shipped to the repository using rail.

Q3. How will the Department of Energy ensure the security of shipments to Yucca Mountain?

A3. The Department is committed to ensuring the security of shipments to Yucca Mountain and will meet or exceed the level of security provided by following the current regulations and additional measures put in place by the Nuclear Regulatory Commission, the Department of Transportation (DOT), and the Department of Homeland Security.

DOE coordinates with these entities to continually assess potential developments that could affect security. In addition, DOE will work with Federal, State, Tribal and local law enforcement, as appropriate, to fulfill our shared responsibilities for spent nuclear fuel transportation safety.

Q4. Why has DOE not analyzed which specific rail and truck routes to Yucca Mountain have the least risk of accident and/or sabotage and the least risk of environmental, economic, and human health impacts in the event of accident and/or sabotage?

A4. Under applicable regulations specific routing selections cannot be made until nearer to the time of shipments. Nevertheless, in its NEPA documentation relating to the Yucca Mountain repository, DOE has analyzed representative routes and has also analyzed the risk of accidents, transportation sabotage considerations, and consequences of potential sabotage events.

Q5. Why shouldn't the analysis of the relative risks of specific rail routes be done now, prior to licensing, instead of after licensing? When will DOE complete such an analysis?

A5. Under applicable DOT regulations, specific trucking and rail routing decisions cannot be made until nearer the time of shipments. Under those regulations, specific rail routing decisions will be made by the rail carriers pursuant to the regulations in effect at the time of the shipments.

As a general matter, however, the DOT's Pipeline and Hazardous Materials Safety Administration, in coordination with the Federal Railroad Administration and the Transportation Security Administration, has recently issued a final rule revising requirements in the Hazardous Materials Regulations applicable to the safe and secure transportation of certain hazardous materials transported in commerce by rail. The final

rule requires rail carriers to compile annual data on these shipments, use the data to analyze safety and security risks along rail routes where those materials are transported, assess alternative routing options, and make routing decisions based on those assessments to select the safest and most secure practicable route. Under the new rule, the railroad carriers are developing their processes for conducting these assessments, on a national scale, taking into account the many thousands of shipments of toxic gases, explosives, and poisons that must be handled safely and securely every day. DOE is monitoring how rail shippers and carriers of such toxic materials are implementing this new rule. DOE is also working with DOT and the railroads to better understand how such assessments are to be conducted, and how spent nuclear fuel shipments need to be considered in such analyses.

Q6. Will DOE contractually bind carriers it contracts with to use those rail routes that DOE has determined to be safest? If not, why not?

A6. DOT's new rail routing rules require the carriers to use the routes the carriers consider safest and most secure, subject to DOT's review. DOE contract incorporate DOE Directives that require DOE contractors to follow these and all other applicable DOT regulations when transporting material on behalf of DOE.

Q7. When does DOE plan to perform an environmental review under the National Environmental Policy Act for its National Transportation Plan and National Operational Plan?

A7. In 2002, DOE issued its *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada,* DOE/EIS-0250F, and in 2008 issued its final *Supplemental Environmental Impact Statement for a Geologic Repository for the*

Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada – Nevada Rail Transportation Corridor, DOE/EIS-0250F-S-2 and its final *Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada*, DOE/EIS-0369. These documents analyze the potential impacts associated with the transportation of spent nuclear fuel and high-level radioactive waste to the Yucca Mountain repository. The National Transportation Plan and National Operation Plan that will be developed are planning documents that implement the proposed action which was already analyzed in these National Environmental Policy Act (NEPA) documents. DOE would conduct supplemental NEPA review if DOE makes substantial changes in the proposed action or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.

Q8. Will DOE require that all nuclear waste shipped by rail to Yucca Mountain be carried in dedicated trains, or will it allow some nuclear waste to be shipped in general freight service? Will DOE analyze and compare the risk between a dedicated train and general freight service, particularly as to railroad route segments that present particular challenges to longer trains?

A8. In July 2005, DOE adopted a policy to use dedicated trains as its usual mode of rail transportation for shipments of commercial spent nuclear fuel and high-level radioactive waste to the Yucca Mountain repository. In adopting this policy, however, DOE has recognized that such materials can be shipped safely regardless of mode and regardless of type of service due primarily to the stringent regulations in place and the robust nature of the transport packages involved. In adopting the policy, DOE has additionally identified the primary benefit of using dedicated trains to be the significant costs savings over the

lifetime of the Yucca Mountain Program. However, there may also be circumstances where general freight service would be more appropriate to promote costs savings, operational flexibility and/or efficiency for shipments to the Yucca Mountain repository.